Space Weather Highlights
19 March - 25 March 2018

SWPC PRF 2221
26 March 2018

Solar activity was very low. The sun was spotless and absent of significant flare activity. No Earth-directed CMEs were observed during the period.

No proton events were observed at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit was at high levels on 19-25 March.

Geomagnetic field activity reached G1 (Minor) storm levels on 19 March and active levels on 23-25 March due to the influence of recurrent, negative polarity CH HSS effects. Quiet to unsettled conditions were observed on 20-22 March.

Space Weather Outlook
26 March - 21 April 2018

Solar activity is expected to be at very low levels throughout the outlook period.

No proton events are expected at geosynchronous orbit.

The greater than 2 MeV electron flux at geosynchronous orbit is expected to be at high levels on 26-28, 30-31 March and 01-02, 12-21 April. Normal to moderate levels are expected for the rest of the period.

Geomagnetic field activity is likely to be at G1 (Minor) storm levels on 26 March and 12 April with active periods likely on 26, 29-30 March, and 11-15, 19, 21 April due to effects from multiple, recurrent CH HSSs. Quiet to unsettled levels are expected for the remainder of the outlook period.

Daily Solar Data

Date	Radio Flux 10.7cm	Sun spot No.	Sunspot Area (10^{-6} hemi.)	X-ray Background Flux	Flares						
					X-ray			Optical			
					C	M	X	S	1	2	3	4
19 March	70	0	0	A0.0	0	0	0	0	0	0	0	0
20 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
21 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
22 March	69	0	0	A0.0	0	0	0	0	0	0	0	0
23 March	68	0	0	A0.0	0	0	0	0	0	0	0	0
24 March	68	0	0	A0.0	0	0	0	0	0	0	0	0
25 March	68	0	0	A0.0	0	0	0	0	0	0	0	0

Daily Particle Data

Date	Proton Fluence (protons/cm ^{2} -day -sr)			Electron Fluence (electrons/cm^2 -day -sr)		
	>1 MeV	>10 MeV	>100 MeV	>0.6 MeV	>2MeV	>4 MeV
19 March	1.3e+06	1.7e+04	3.7e+03	4.8e+08		
20 March	8.5e+05	1.6e+04	3.5e+03	7.5e+08		
21 March	9.7e+05	1.7e+04	3.8e+03	8.5e+08		
22 March	1.4e+06	1.6e+04	3.6e+03	5.3e+08		
23 March	6.1e+05	1.5e+04	3.1e+03	1.8e+07		
24 March	7.2e+05	1.6e+04	3.3e+03	4.7e+07		
25 March	7.7e+05	1.6e+04	3.3e+03	1.1e+08		

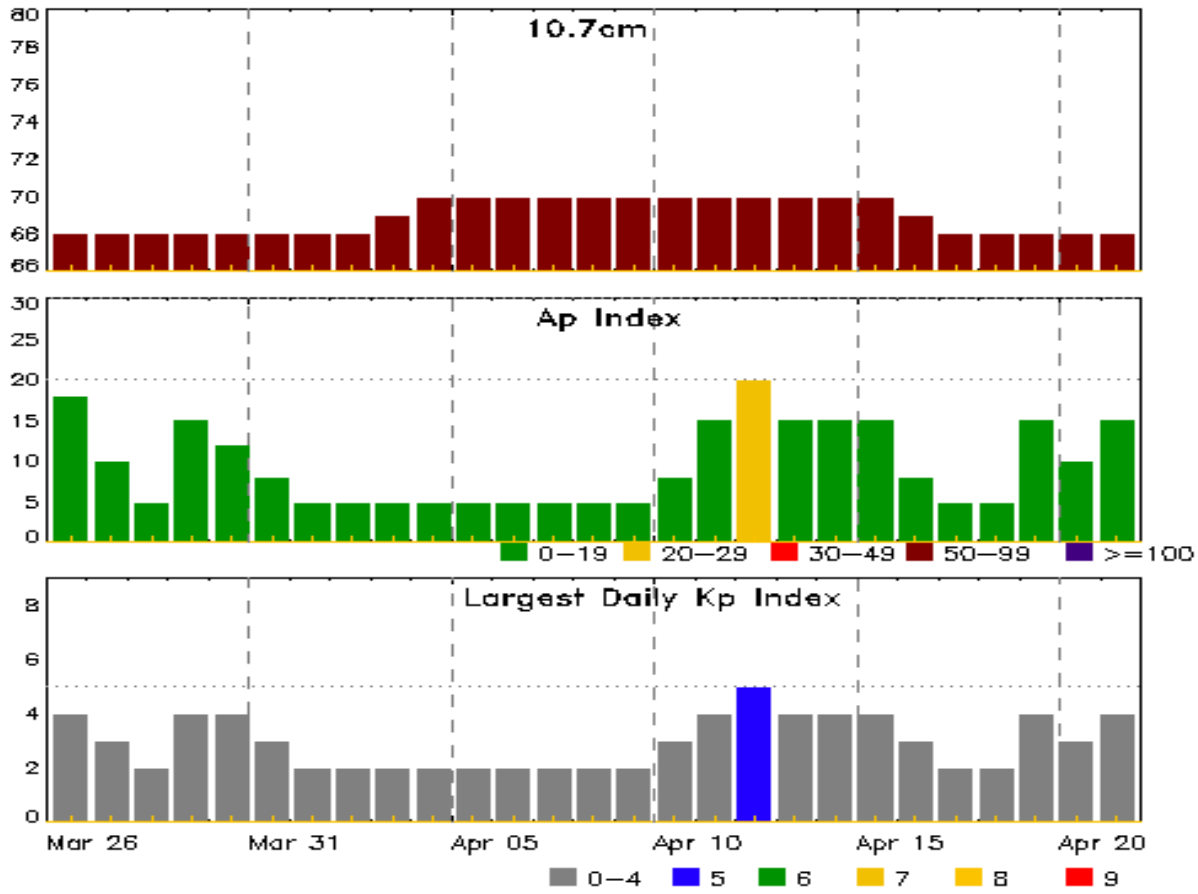
Daily Geomagnetic Data

Date	Middle Latitude Fredericksburg		High Latitude College		Estimated Planetary	
	A	K-indices	A	K-indices	A	K-indices
19 March	13	5-3-3-1-2-1-2-2	18	4-4-4-4-3-2-2-2	16	5-4-3-1-2-2-2-3
20 March	7	3-3-0-0-2-1-2-2	4	2-1-0-2-2-1-1-0	8	3-3-1-1-2-0-2-2
21 March	3	1-2-0-0-1-1-2-1	2	0-1-0-1-0-1-1-1	4	2-2-1-0-1-0-2-1
22 March	6	1-2-1-1-2-2-1-3	5	1-1-0-0-2-1-2-3	7	1-2-1-1-1-2-3-3
23 March	15	4-3-1-3-2-2-3-4	14	2-2-1-5-3-2-2-3	17	4-3-2-3-2-2-4-4
24 March	7	2-1-2-2-2-1-2-3	20	2-1-3-6-4-3-1-2	9	2-2-2-2-2-2-2-3
25 March	15	4-4-3-3-2-2-1-3	35	2-3-6-6-4-5-2-3	22	4-4-3-3-2-2-2-4

Alerts and Warnings Issued

Date & Time of Issue UTC	Type of Alert or Warning	Date & Time of Event UTC
19 Mar 0207	ALERT: Geomagnetic K = 5	19/0202
19 Mar 0859	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
19 Mar 1946	WATCH: Geomagnetic Storm Category G1 predicted	
20 Mar 0416	WARNING: Geomagnetic K = 4	20/0415 - 1200
20 Mar 0900	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
21 Mar 0859	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
22 Mar 0859	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
22 Mar 1327	CANCELLATION: Geomagnetic Storm Category G1 predicted	
22 Mar 1743	WATCH: Geomagnetic Storm Category G1 predicted	
23 Mar 0133	WARNING: Geomagnetic K = 4	23/0133 - 0600
23 Mar 0138	ALERT: Geomagnetic K = 4	23/0138
23 Mar 0514	EXTENDED WARNING: Geomagnetic K = 4	23/0133 - 1200
23 Mar 2031	WARNING: Geomagnetic K = 4	23/2031 - 24/0900
23 Mar 2101	ALERT: Geomagnetic K = 4	23/2059
23 Mar 2102	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
24 Mar 1706	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
24 Mar 2239	WARNING: Geomagnetic K = 4	24/2240 - 25/0900
25 Mar 0251	ALERT: Geomagnetic K = 4	25/0252
25 Mar 0854	EXTENDED WARNING: Geomagnetic K = 4	24/2240 - 25/1500
25 Mar 1532	CONTINUED ALERT: Electron 2MeV Integral Flux >= 1000pfu	16/0105
25 Mar 2123	WARNING: Geomagnetic K = 4	25/2122 - 26/0600
25 Mar 2136	ALERT: Geomagnetic K = 4	25/2136
25 Mar 2149	WARNING: Geomagnetic K = 5	25/2150 - 26/0300

Twenty-seven Day Outlook



Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index	Date	Radio Flux 10.7cm	Planetary A Index	Largest Kp Index
26 Mar	68	18	4	09 Apr	70	5	2
27	68	10	3	10	70	8	3
28	68	5	2	11	70	15	4
29	68	15	4	12	70	20	5
30	68	12	4	13	70	15	4
31	68	8	3	14	70	15	4
01 Apr	68	5	2	15	70	15	4
02	68	5	2	16	69	8	3
03	69	5	2	17	68	5	2
04	70	5	2	18	68	5	2
05	70	5	2	19	68	15	4
06	70	5	2	20	68	10	3
07	70	5	2	21	68	15	4
08	70	5	2				

Energetic Events

	Time			X-ray		Optical Information			Peak Radio Flux		Sweep Freq Intensity	
Date	Begin	Max	Half Max	Class	Integ Flux	Imp/ Brtns	Location Lat CMD	Rgn #	245	2695	II	IV

No Events Observed

Flare List

	Time				Optical		
Date	Begin	Max	End	X-ray Class	Imp/ Brtns	Location Lat CMD	Rgn #
25 Mar	1200	1201	1202	A1.1			

Region Summary

	Location		Sunspot Characteristics					Flares							
		Helio	Area	Extent	Spot	Spot	Mag	X-ray			Optical				
Date	Lat CMD	Lon	10^{-6} hemi.	(helio)	Class	Count	Class	C	M	X	S	1	2	3	4
			Region 2701												
15 Mar	S12W08	99	10		Axx	1	A								
16 Mar	S12W22	100	plage												
17 Mar	S12W36	101	plage												
18 Mar	S12W50	102	plage												
19 Mar	S12W64	102	plage												
20 Mar	S12W78	104	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 99

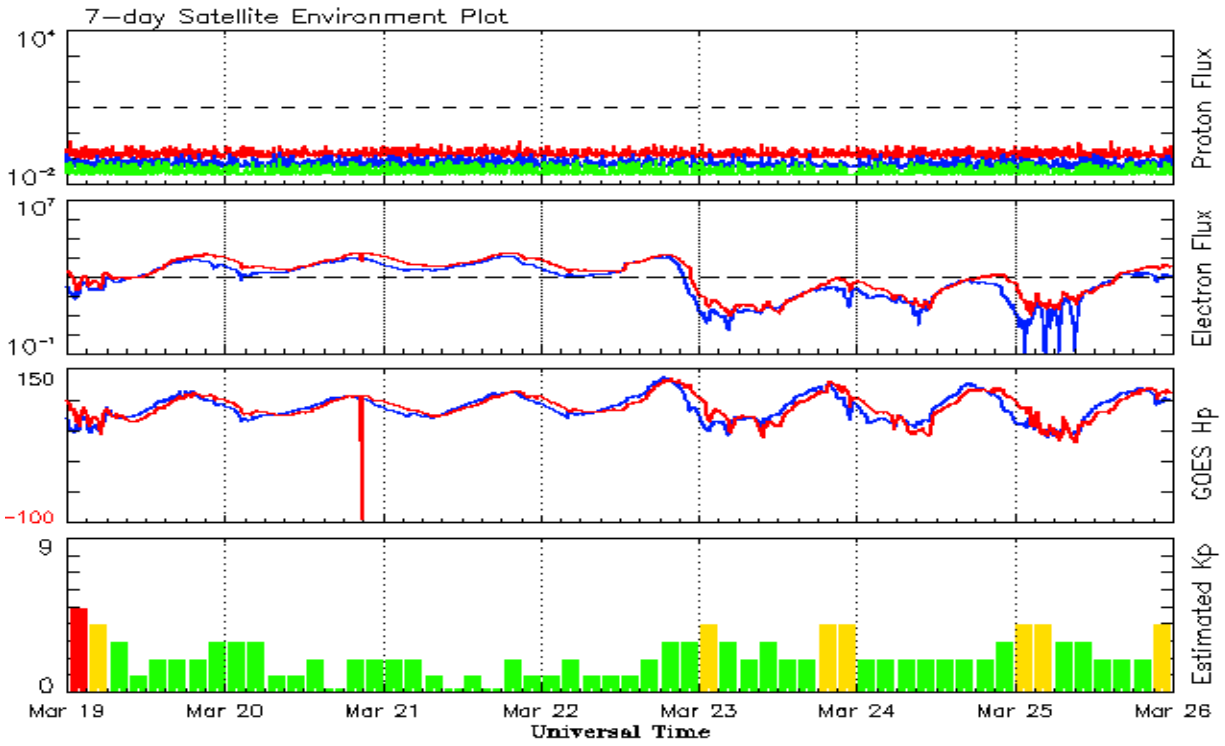
			Region 2702												
17 Mar	N21W47	112	10	3	Bxo	5	B								
18 Mar	N19W60	112	10	4	Bxo	3	B								
19 Mar	N19W74	112	plage												
20 Mar	N19W88	114	plage												
								0	0	0	0	0	0	0	0

Crossed West Limb.
Absolute heliographic longitude: 112

Recent Solar Indices (preliminary)
Observed monthly mean values

	Sunspot Numbers					Radio Flux		Geomagnetic	
	Observed values		Ratio	Smooth values		Penticton	Smooth	Planetary	Smooth
Month	SEC	RI	RI/SEC	SEC	RI	10.7 cm	Value	Ap	Value
				2016					
March	40.9	32.5	0.80	47.7	30.2	91.6	96.6	11	11.8
April	39.2	22.7	0.58	45.0	28.7	93.4	95.3	10	11.8
May	48.9	30.9	0.64	42.1	26.9	93.1	93.2	12	11.7
June	19.3	12.3	0.65	39.0	24.9	81.9	90.4	9	11.4
July	36.8	19.4	0.53	36.5	23.1	85.9	87.7	10	11.2
August	50.4	30.1	0.60	34.2	21.6	85.0	85.5	10	11.2
September	37.4	26.8	0.72	32.1	19.9	87.8	83.7	16	11.3
October	30.0	20.0	0.67	31.1	18.9	86.1	82.5	16	11.6
November	22.4	12.8	0.57	29.4	17.9	78.7	81.1	10	11.6
December	17.6	11.1	0.64	28.1	17.1	75.1	80.0	10	11.4
				2017					
January	28.1	15.7	0.55	27.3	16.7	77.4	79.4	10	11.3
February	22.0	15.8	0.71	25.5	15.9	76.9	78.7	10	11.3
March	25.4	10.6	0.42	24.6	15.4	74.6	78.6	15	11.5
April	30.4	19.4	0.64	24.3	14.9	80.9	78.4	13	11.5
May	18.1	11.3	0.62	23.1	14.0	73.5	77.7	9	11.3
June	18.0	11.5	0.64	22.0	13.3	74.8	77.3	7	11.3
July	18.8	10.7	0.59	20.8	12.6	77.7	76.8	9	11.0
August	25.0	19.6	0.80	19.7	11.7	77.9	76.3	12	10.7
September	42.2	26.2	0.62			92.0		19	
October	16.0	7.9	0.49			76.4		11	
November	7.7	3.4	0.44			72.1		11	
December	7.6	4.9	0.64			71.5		8	
				2018					
January	7.8	4.0	0.51			70.0		6	
February	16.0	6.4	0.40			72.0		7	

Note: Values are final except for the most recent 6 months which are considered preliminary. Cycle 24 started in Dec 2008 with an RI=1.7.



Weekly Geosynchronous Satellite Environment Summary
Week Beginning 19 March 2018

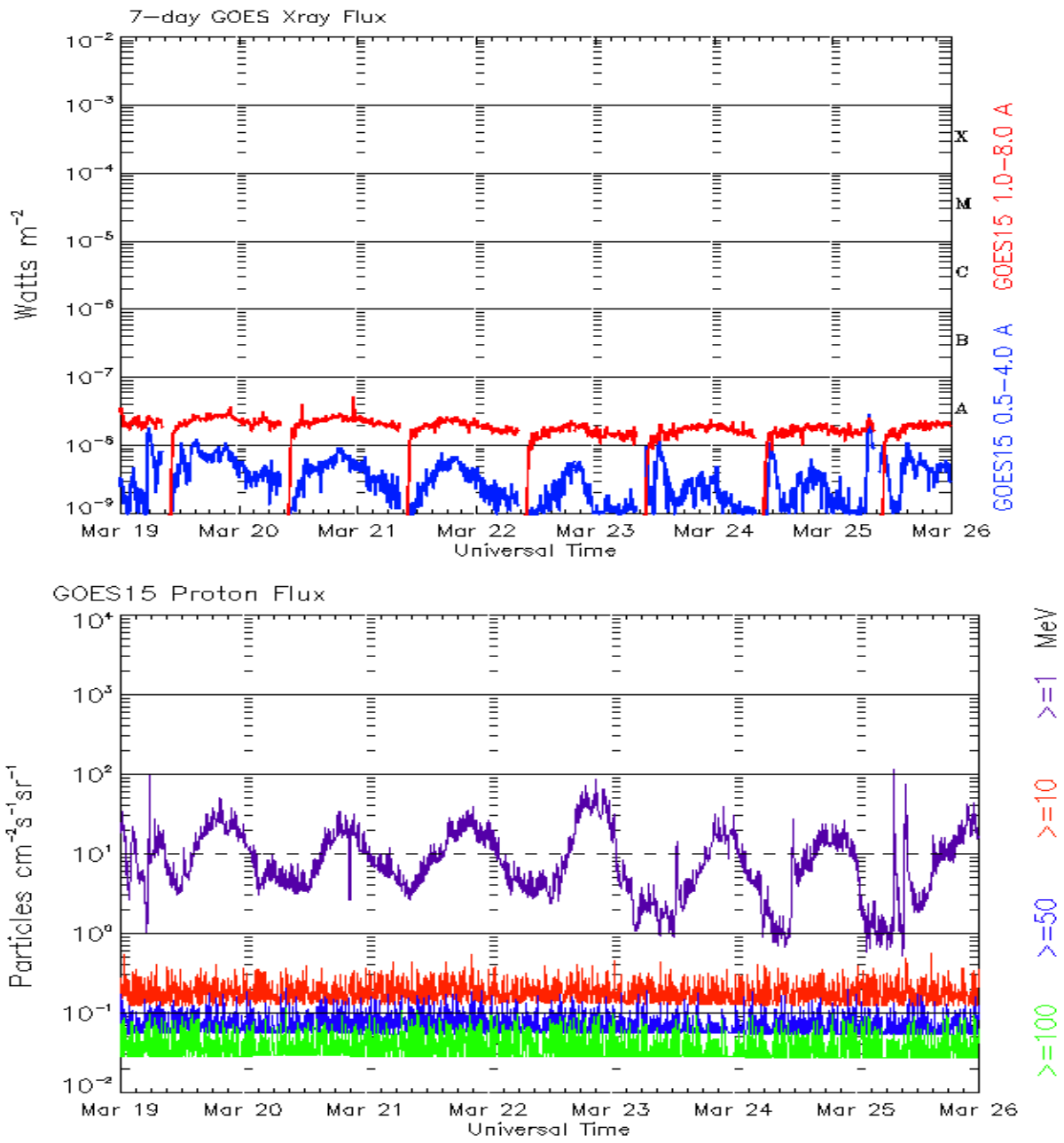
The proton flux plot contains the five-minute averaged integral proton flux (protons/cm^2-sec -sr) as measured by the SWPC Primary GOES satellite, near West 75, for each of three energy thresholds: greater than 10, 50, and 100 MeV.

The electron flux plot contains the five-minute averaged integral electron flux (electrons/cm^2-sec -sr) with energies greater than 2 MeV by the SWPC Primary GOES satellite.

The Hp plot contains the five minute averaged Hp magnetic field component in nanoteslas (nT) as by the SWPC Primary GOES satellite. The Hp component is parallel to the spin axis of the satellite, which is nearly parallel to the Earth's rotation axis.

The Estimated 3-hour Planetary Kp-index is derived at the NOAA Space Weather Prediction Center using data from the following ground-based magnetometers: Boulder, Colorado; Chambon la Foret, France; Fredericksburg, Virginia; Fresno, California; Hartland, UK; Newport, Washington; Sitka, Alaska. These data are made available thanks to the cooperative efforts between SWPC and data providers around the world, which currently includes the U.S. Geological Survey, the British Geological Survey, and the Institut de Physique du Globe de Paris.

The data included here are those now available in real time at the SWPC and are incomplete in that they do not include the full set of parameters and energy ranges known to cause satellite operating anomalies. The proton and electron fluxes and Kp are 'global' parameters that are applicable to a first order approximation over large areas. H parallel is subject to more localized phenomena and the measurements generally are applicable to within a few degrees of longitude of the measuring satellite.



Weekly GOES Satellite X-ray and Proton Plots
Week Beginning 19 March 2018

The x-ray plots contains five-minute averages x-ray flux (Watt/m^2) as measure by the SWPC primary GOES X-ray satellite, usually at West 105 longitude, in two wavelength bands, 0.05 - 0.4 and 0.1 - 0.8 nm. The letters A, B, C, M and X refer to x-ray event levels for the 0.1 - 0.8 nm band.

The proton plot contains the five-minute averaged intergral flux units (pfu = protons/cm^2 -sec -sr) as measured by the primary SWPC GOES Proton satellite for each of the energy thresholds: >1, >10, >30, and >100 MeV. The P10 event threshold is 10 pfu at greater than 10 MeV.

Preliminary Report and Forecast of Solar Geophysical Data (The Weekly)

Published every Monday by the Space Weather Prediction Center.

U.S. Department of Commerce
NOAA / National Weather Service
Space Weather Prediction Center
325 Broadway, Boulder CO 80305

Notice: The 27-day Outlook, Satellite Environment, X-ray and Proton plots have been redesigned. Comments and suggestions are welcome SWPC.Webmaster@noaa.gov

The Weekly has been published continuously since 1951 and is available online since 1997.

http://spaceweather.gov/weekly/ -- Current and previous year
http://spaceweather.gov/ftpmenu/warehouse.html -- Online achive from 1997
http://spaceweather.gov/ftpmenu/ -- Some content as ascii text
http://spaceweather.gov/SolarCycle/ -- Solar Cycle Progression web site

http://spaceweather.gov/contacts.html -- Contact and Copyright information
http://spaceweather.gov/weekly/Usr_guide.pdf -- User Guide